Introduction

Working Group Session, 5: New Physics Searches Involving Top (Top, NP)

Tobias Golling (Yale), Jay Hubisz (Syracuse), Andrew Ivanov (Kansas State), Maxim Perelstein (Cornell)

what Snowmass is not

We don't make recommendations

what Snowmass is

We evaluate by benchmarking

We speculate by calculating

We dream about following the physics

We imagine discovery

(Chip Brock)

Fine tuning

The large radiative corrections look particularly absurd, if, say, $\Lambda_{\text{new physics}} = M_p$. Says something like

$$m_H^2 = 36,127,890,984,789,307,394,520,932,878,928,933,023$$

$$-36,127,890,984,789,307,394,520,932,878,928,917,398$$

This looks crazy!

(Michael Dine)

Benchmarks

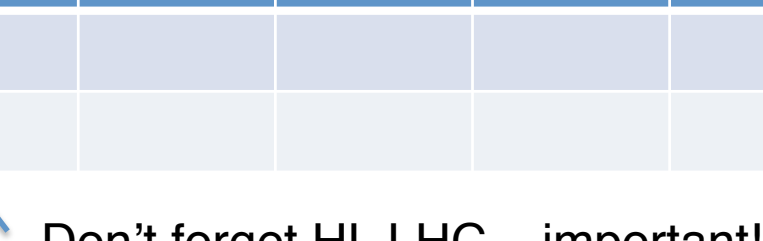
- Vanilla stops
- Stealth stops
- Compressed stop spectra
- RPV stops
- Other top (and bottom) partners: vector-like quarks
  - Strong pair production
  - EW single production
  - Production through heavy gluon
- $t\bar{t}$ resonances in collaboration with "Top WG6: Detecting Top Quarks (Including Boosted)"
- We welcome other benchmarks (this potential list is very long)
  - Top+invisible
  - W'→tb
  - 3 tops, 4 tops
  - …

See talk by Kaustubh Agashe yesterday for more details

Our Snowmass Goals

- Fill table with our sensitivity for these benchmarks, using proposed facility parameters
  - As consistent and complete as possible

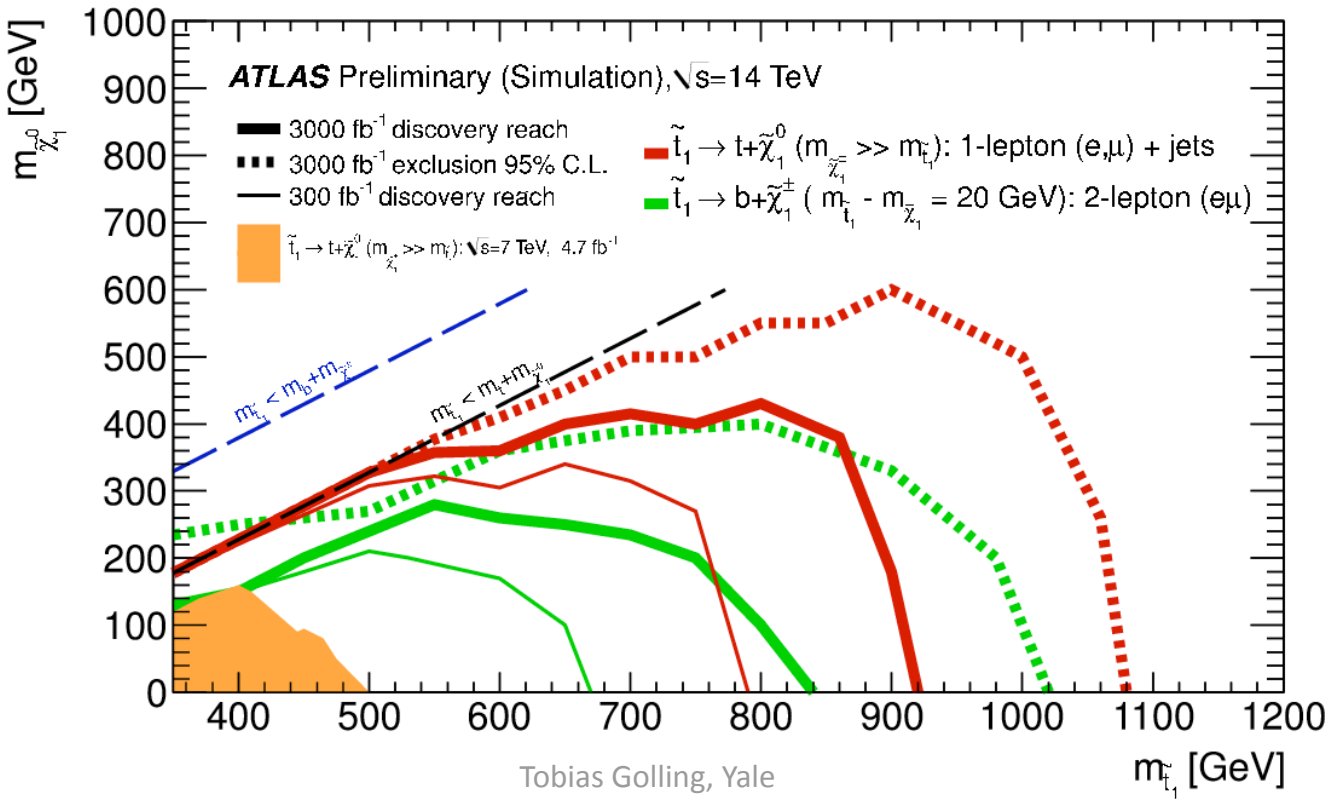
	LHC300	LHC3000	HELHC	VLHC	ILC	CLICK	…		
Benchmark 1									
Benchmark 2									



- Putting the goal a bit provocative: “What is our final word on Naturalness?”

LHC Experiments' Inputs

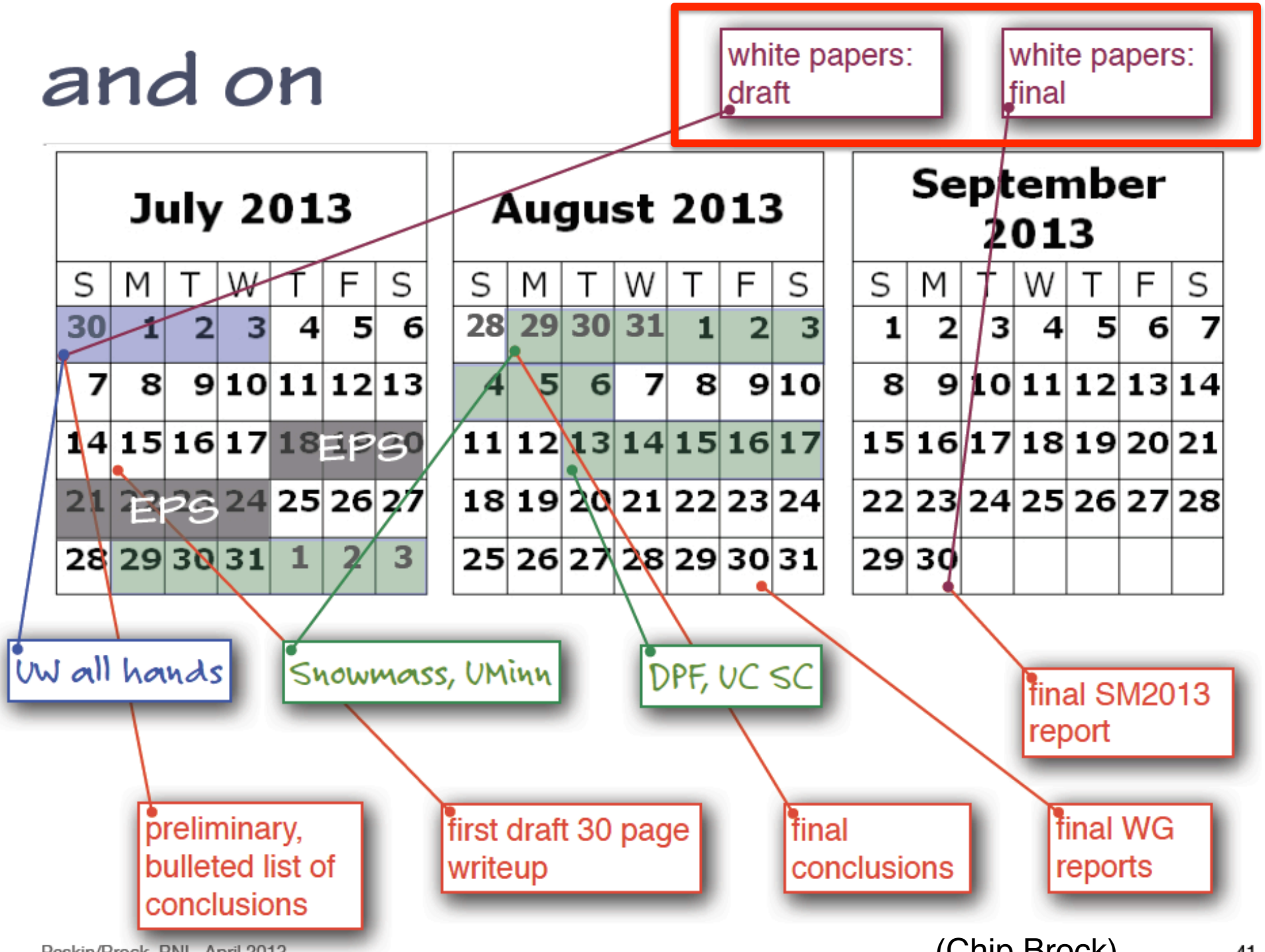
- Some work already done for http://europeanstrategygroup.web.cern.ch/EuropeanStrategyGroup/
- See also e.g. https://twiki.cern.ch/twiki/bin/view/AtlasPublic/UpgradePhysicsStudies



Please Contribute

- Please contact us if you'd like to contribute
- See working pages: http://www.snowmass2013.org/tiki-index.php?page=TopQuarkWorkingPages
- See also who is working on what currently: http://www.lepp.cornell.edu/~maxim/TopNPprojects.html
- In close collaboration with "HE4 group: The Path Beyond the Standard Model" (contact: Meenakshi Narain (Brown))

and on



(Chip Brock)

14:00 - 16:00 Working Group Session, 5: New Physics Searches Involving Top (Top, NP)

Convener: J. Hubitz

Location: Room B

14:00 **Intro (10 min)** *10'*

14:10 **Exotic charge Heavy Top Quarks** *20'*
Speaker: Aram Avetisyan (Boston University)

14:30 **Vector Like Quarks** *15'*
Speaker: Kevin Black (Boston University)

14:45 **Using Deconstructed Transverse Mass Variables to Uncover Stops with Compressed Spectra** *20'*
Speaker: Devin Walker (SLAC/Stanford)

15:05 **stop->chargino->neutralino in the dileptonic channel** *15'*
Speaker: Yang Bai (Fermilab)

15:20 **Asymmetric stop decays** *15'*
Speaker: Michael Graesser (Los Alamos)

15:35 **ttbar resonances** *10'*
Speaker: Chris Pollard (Duke)

15:45 **Backgrounds** *15'*
Speaker: John Stupak (Purdue University, Calumet)